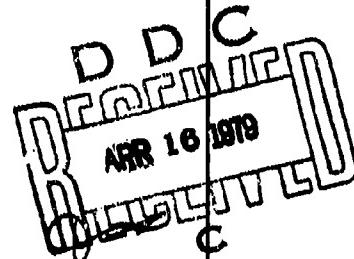
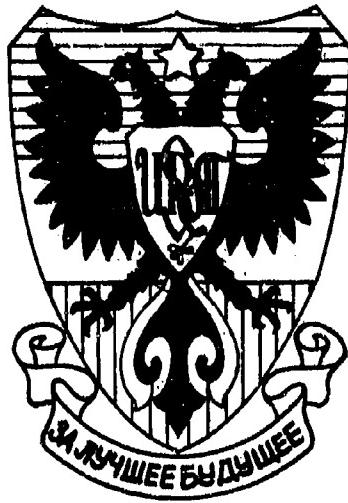


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STUDENT RESEARCH REPORT

CPT. KEVIN V. CULHANE

THE SOVIET ATTACK HELICOPTER

-1977-

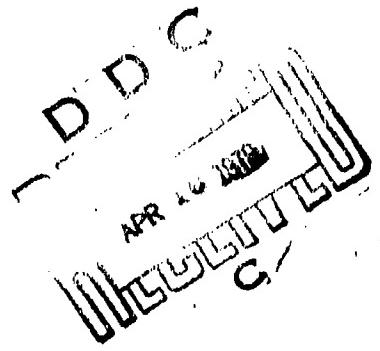
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(6) THE SOVIET ATTACK HELICOPTER

"The armed helicopter may turn out to be a means of fundamental change in the nature of ground combat."

V. Savkin I

(9) Airpower Research Dept.

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Captain Kevin V. Culhane

March 1978

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FOREWORD

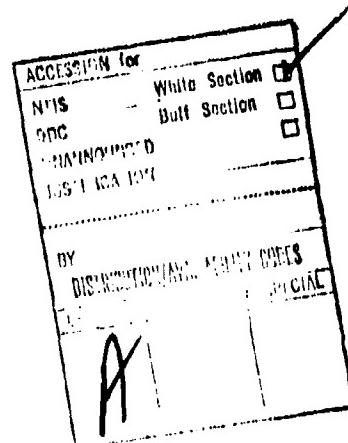
This research project represents fulfillment of a student requirement for successful completion of the overseas phase of training of the Department of the Army's Foreign Area Officer Program (Russian).

Only unclassified sources are used in producing the research paper. The opinions, value judgments and conclusions expressed are those of the author and in no way reflect official policy of the United States Government; Department of Defense; Department of the Army; Office of the Assistant Chief of Staff of Intelligence; or the United States Army Institute for Advanced Russian and East European Studies.

Interested readers are invited to send their comments to the Commander of the Institute.



ROLAND LAJOINIE
LTC, MI
Commander



SUMMARY

This paper examines the evolution of the Soviet attack helicopter through its initial "gunship" stages to the present sophisticated 'HIND D'. Also, it addresses the corresponding changes in Soviet helicopter tactics which have accompanied their increase in both firepower and maneuverability under the influence on Indochina and the Middle East experiences. Finally, a brief look is taken at possible future development of the attack helicopter force of the Soviet Union specifically, the author predicts that the Soviets will forsake the present scout-attack-and transport abilities of the Hind for a more powerfully equipped and more armored "artillery platform" type helicopter.

INTRODUCTION

"There can be no longer any doubt but that helicopters, equipped with diverse types of onboard weapons and capable of destroying ground targets, have become an indispensable part of modern combat."²

"Until recently, a secondary role was allotted to helicopters. They were used most frequently as a transport system. Now the situation has changed. In the armies of the capitalist countries, great hopes are placed in helicopters. While possessing powerful armament and the ability to change flight altitude and speed within wide ranges, rotary winged vehicles do not require expensive airfields and are capable of destroying tanks, other armored targets, men and firing systems."³

There can be little doubt that these quotes, and numerous others like them found today in many Soviet military sources, reflect the growing concern and awareness of the Soviets for the role of the attack helicopter (Boevoi Vertolet) on the modern day battlefield. Colonel M. Belov, the foremost Soviet writer on helicopter tactics, in April of 1975, said that "helicopters have become firmly established in the armament systems of modern armies, and they are continuing to develop intensely. This has arisen, initially, from the necessity for using more mobile and maneuverable machines than wheeled and track vehicles in all-arms combat, and subsequently, from the unique capability of helicopters to solve various problems such as transferring troops and cargo, fire support of ground forces, battling tanks and other armored targets, communications and control, reconnaissance and fire adjustments, supply and evacuation, rescue and other auxiliary operations.⁴ In April of 1976, Belov reflected an evolutionary change in Soviet attitude toward attack helicopters stating that fire-support helicopters may be regarded as a highly effective weapon for land forces. He felt that these helicopters could be

used not only to support subunits on the battlefield but also to destroy various targets independently, to accompany airmobile troops and landing forces both in flight and after landing, to fight tanks and other armored targets and also to destroy enemy aircraft and airmobile troops both in the air and on the ground.⁵

It is obvious then that an increased role for the attack helicopter is predicted for the Soviet army. The process of its evolution and considerations for its future development and employment will constitute the scope of this paper.

H I S T O R Y

Since the early 50's Western armed forces have been making increasing use of helicopters in their operations. Besides traditional transport and liaison roles, helicopters equipped with various weapons systems continued to receive more active roles in ground combat operations. The decisive step from armed helicopter to true combat helicopter took place during the course of the Vietnam War, whose very special characteristics made the introduction of such aircraft a necessity. In the USSR, this development started considerably later. Large scale equipping of various types of helicopters with weapons only began in 1967. With the exception of the naval Ka-25 "Hormone", fire power was provided by arming older, partially obsolete types. Thus, the Mi-4 "Hare", the Mi-2 "Hoplite", the Mi-4 "Hound", and the Mi-8 "Hip"⁶ were used for combat missions equipped almost exclusively with UB-16 or UB-32 pods containing unguided 57mm rockets, and with wire-guided anti-tank missiles of the "Sagger" type. Weapons systems electronics were kept to a minimum.⁷

There can be little doubt that a great amount of indecision within the U.S. intelligence community surrounded the employment of a "strictly attack-type" Soviet helicopter. As late as 1967, such statements as the following could be found in "informed" U.S. sources:

"At present there is no evidence to indicate that the Soviets are actively developing a heavily armed helicopter in the "gunship" or "flying tank" category."⁸

Also in 1967, Malcolm R. Currie, then Director of Defense Research and Engineering, said that the Soviets did not consider helicopters a major military item, although US experience in helicopter development for warfare in Southeast Asia may have changed that outlook.⁹

In contrast to these statements, 1967 saw the staging of the Soviet military exercise "Dnepr" which was filmed for western showing. Here, extensive use of armed helicopters supporting ground attacks and river crossings was displayed. These helicopters, Mi-4s "Hounds", were shown firing ATGMs at armored vehicles and scoring impressive hits.

In Soviet military circles, there appeared to have been a debate over the survivability of the helicopter on the mid or high intensity battlefield. Criticism of the US use of attack helicopters in Vietnam began to wane in such publications as Voennyi Vestnik (Military Herald) and Krasnaia Zvezda (Red Star) in the 1969-70 time frame, conveniently timed with the first appearance of the "Hind" attack helicopter. The 1973 Mideast War seems to have added the final initiative to an already quickly developing Soviet helicopter force, with military opinion swinging almost totally in the direction of a more pronounced attack helicopter force:

(August, 1975) The hostilities in Indochina and the Middle East have proved that helicopters can be widely employed both for combat security and support of land forces and for carrying out independent combat missions. 10

(December, 1976) The practice of numerous troop exercises and the experience of military operations in Indochina and the Middle East testify that as a result of the mass introduction of helicopters, the combat capabilities of the land forces, especially their mobility and fire power, sharply increased, and considerable changes in the employment and tactics of these forces took place. 11

THE HIND

The USSR's improvisation phase of attack helicopters lasted up to about 1970. In 1971, the first signs pointing to a new helicopter type were observed; field trials were presumably completed and series production started by the end of 1972. The first units of this mysterious Mi-24 were identified in East Germany with Group of Soviet Forces in Germany (GSFG) in spring of 1973.¹² In early 1974, at least two units of approximately squadron strength, in East Germany (16th Frontal Aviation Army) had been equipped with Mi-24s.¹³

The design of this aircraft made it the first true Soviet combat helicopter. It was code-named "Hind" by NATO's Air Standards Coordinating Committee. Since two differing prototype designs underwent flight trials, it was decided to call the type with anhedral stub wings the Hind "A", and the type with straight wings the Hind "B". As a result of the trials, only the 'A' version was series produced, so that contrary to the usual NATO convention the 'A' does not in this case refer to a prototype.¹⁴

The Mi-24 "Hind A" carries a crew of four - pilot, copilot, a dedicated gunner/navigator, and an airborne "forward observer" who tells the gunner how to lay his weapons. The forward observer uses radar for target acquisition and to lay the aircraft's .60 cal. (14.5mm) rifled gun, which has a range of 2½ to 3 kilometers.

In addition, Hind carries 57mm free rockets for suppressive fire, with a range of about 2 kilometers. All told, its weapons comprise about 2,800 lbs. of armament. Missiles and rockets are carried on 8 launcher rails, 4 on each pylon. The aircraft also has enough room inside and payload to carry a full reload of its weapons, either for itself or a "buddy" gunship which has expended its stores. At the same time, there is room and payload to carry 8 troops.

The Hind differs from the US Army's Cobra and AH attack helicopters in many respects: not only is the Mi-24 much bigger with more armament, but it serves as a combination scout-attack and transport helicopter at the same time. The Soviets feel that having three different ships perform these roles presents an unmanageable air traffic control problem, especially at night or in marginal weather. Moreover, Soviet tacticians didn't think it very practical to have gunships flying or firing through troop carrying helicopters.¹⁵

Cockpit instrumentation on the Mi-24 is said to be about the same as on US helicopters, with some advantages in a few areas. The plane has a good stability augmentation system, 3 generators, and 2 electrical systems.¹⁶

Other features include flat, bulletproof, anti-glint cockpit windows, blade and tail-rotor deicing (US helicopters have none) and twin-turbine engines.¹⁷

Another change took place in about 1975, when a new "Hind" was observed and designated the "Hind C". This machine seems to have replaced the "Hind A" and has a similar appearance except for the transfer of the tail rotor to the port side.

In early 1977, the US recognized and revealed the existence of a new "Hind D" version of the Soviet Mi-24 attack helicopter. This development again seems to have caught US intelligence agencies by surprise both in the speed of employment of the "Hind D" and its sophistication.¹⁸ The new helicopter appears to be a follow-on development of the "Hind C" with front fuselage completely redesigned to enhance its employment as a gunship. It also has tandem stations with individual canopies for the weapons operator in the forward position and the pilot with the rear seat raised to allow an unobstructed forward view. Other changes include an unidentified probe fitted forward of the top starboard corner of the bullet-proof windscreens and a four-barrel Gatling-type machine-gun under the nose in a turret configuration with a wide range of movement in azimuth and elevation. An undernose pack for sensors, probably includes a forward-looking infra-red scanner and low-light level TV. The wing armament seems to have remained the same.¹⁹

Also of interest are the recent reports in the Armed Forces Journal that the Soviets have operationally tested a fire-and-forget missile on armed helicopters that has more range than the US Army's Hellfire missile. Reportedly, this missile has a range of about 8 kilometers and 3 guidance sensors with optical contrast and a TV seeker in the nose. The missile may also incorporate a radar altimeter to measure height above terrain for low level approach to the target, but then can be picked up by the helicopter's sensors and guided terminally onto the target.²⁰

ORGANIZATION

Presently, the "Hind" helicopter force, as an autonomous helicopter regiment, organizationally falls under the Frontal Aviation (Frontovaya Aviatsiya) arm of the Soviet Air Force (Voenno-Vozdushnye Sily). Frontal Aviation, which is the Russian version of the Western tactical air force, is organized into 16 Tactical Air Armies. As an example, the 16th Frontal Aviation Army assigned to Group Soviet Forces Germany (GSFG) comprises more than 1,200 aircraft and contains 2 to 3 helicopter regiments equipped with the Hind.²¹ Soviet tactical doctrine would indicate that in the case of hostilities, the "Hind" regiments, either whole or in part, would be placed under operational control of Front commanders and then further subordinated to the Divisional commanders as the tactical situation dictates, (ie. for direct support of breakthrough operations).

"The effectiveness of using helicopters in combat lies in the immediate dependence on their organizational subordination."²²

MISSIONS

As stated in the introduction, Soviet tacticians are considering very specific missions for the "Hind" in conjunction with direct unit operational support. Specific missions which are likely candidates for this force, either autonomously or in support of airmobile operations, include the seizure of critical terrain features such as road junctions, mountain passes, river crossing sites or bridges. Other possible targets include nuclear storage sites, communication facilities and forward logistical support facilities.²³ These specific missions would, of course, be in addition to the "artillery platform", "armor-killing", and "ATGM suppression" roles that will be its main role on the battlefield:

Until recently, helicopters on the battlefield were assigned a minor role, They were employed for various kinds of support of ground operations. Today, helicopters have turned into a powerful means of destroying various ground targets.....

Let us analyze some characteristics of helicopters and the methods of their operation.

The helicopter flying range amounts to 500-1,500 km, allowing them not only to maneuver successfully over the battlefield and give fire support to ground subunits, but also to make reconnaissance of enemy troops and communications, to land troops, sabotage and reconnaissance parties, to strike blows at various objects in the enemy rear far from the front line.²⁴

TACTICS AND VULNERABILITIES

Tactical considerations for the fielding of a Soviet attack helicopter appear to have been based on Western/Middle East field experience and perceived Soviet anti-aircraft vulnerabilities of the helicopter on the contemporary battlefield. Certainly, great concern and interest have been shown in the USSR over the use of the attack helicopter in antitank warfare, since the US's successful use of ATGMs in Vietnam in the early 1970's. In 1974, Belov remarked,

Special hopes are placed on helicopters. Their advantages over other weapons are seen in their higher rate of movement and their ability to maneuver and conduct direct fire from great distances regardless of terrain conditions and to deliver surprise attacks from the most advantageous directions... All this makes it possible to utilize helicopters effectively for warfare against tanks and other armored targets in various types of battle and under the most diverse conditions.²⁵

The value of the attack helicopter in antitank warfare was further emphasized in the major lessons learned of the October, 1973 War in the Middle East. General Fahmy, armed forces chief of staff of the Soviet-advised Egyptians noted,

The Egyptian experience with helicopterborne vertical assaults deep into enemy territory proved their value in the October War, and he thinks their future development for this

role, combined with an increase in their antitank capability, augurs an expanded role for the helicopter. He recognizes that the assault helicopter is vulnerable in certain situations and is bound to take losses. But, he believes these losses will remain at an acceptable level in relation to the military advantages offered by the helicopter's unique capabilities. He notes that, while antitank helicopters may not be fully effective in the midst of a massed tank battle, they can play an important role in the pre-battle developments by harassing tanks where they least expect attacks and disrupting their movements in the main battle area.²⁶

Having watched these conflicts with a definite purpose in mind, the Soviets also became very interested in the vulnerability studies conducted in the West on the midintensity conflict scenario. The Carmonette Air-Mounted Antitank System Effectiveness war games study conducted in 1962, the Joint Attack Helicopter Instrumented Evaluation (Ansbach Test) conducted in 1972, and the Tactical Helicopter Employment Study (THESS Study) completed in 1973, have all been referred to statistically in Soviet literature as proof of Western belief in the survivability of the attack helicopter in an antitank role.²⁷

With the changes that have taken place in the 'Hind D', two new roles may be seen in the tactical use of this helicopter. The addition of the four-barrel Gatling-type machinegun may indicate an increased role in ATGM suppression when accompanied with the 57mm rockets already available. Also, if the fire-and-forget missile is a fact, a role as an antiaircraft weapon against "fast moving" planes could be seen in the airspace along the FEBA.

NAVAL CAPABILITIES

Another aspect of the attack helicopter force that must be considered is the combat employment of helicopters at sea. Colonel Belov considers that in naval operations seaborne helicopters can be assigned various missions, to include the support of landing forces with fire, conducting antisubmarine operations and providing close defense and protection of ships patrolling off the coast and in

river estuaries.²⁸ For this mission, the present "work horse" of the Soviet fleet is the Kamov KA-25 "Hormone" which is equipped with one or two 500mm anti-submarine torpedoes, nuclear or conventional depth charges, and in various configurations with ground support weapons. KA-25s are found on the "Kiev class" cruisers (estimated 35 aircraft), aboard the "Moskva" and "Leningrad" helicopter cruisers (estimated 18 aircraft), and on "Kresta" and "Kara" class cruisers.²⁹ Also of interest is the mention of the "Hind" helicopter as a possible candidate for employment aboard the Kiev aircraft carrier.³⁰

CONCLUSIONS

Today it is estimated that the USSR has approximately 300 "Hinds" operational in three configurations: A, C and D models. It is also felt that Russia's helicopter production has increased over 50 percent from predicted Pentagon estimates. Thus, in the only field where the US had maintained some kind of production advantage in recent years, the Soviets have taken the initiative.³¹

This initiative, I believe, will bring forth the logical follow-on to the Hind 'D'. This "strictly attack" helicopter, presuming the Soviets preoccupation with "hugeness", will be more heavily armored in order to increase its battlefield survivability. It will also give up its troop transport role in order to increase fuel capacity and armament, which may include cannon-type weapons and an additional launch capability for ATGM and antiaircraft missiles. This idea of "specially designed" helicopters for specific roles is not a new one within Soviet military thinking:

There are different viewpoints concerning the development of fire-support helicopters. According to the majority of military specialists, these helicopters must be adopted for destroying targets of various kinds.³²

In land operations, an ever growing role is to be played by fire support helicopters in prelanding assaults, during the landing of troops, and their subsequent actions. Here, the construction of specially designed fighting helicopters is recommended. Their task will be to escort and protect reconnaissance helicopters, destroy fire emplacements and other objectives hampering the landing of transport helicopters, protect the airlifting

of troops by helicopters, conduct prelanding fire preparation in the assault landing area and provide fire support to the troops that have already landed.³³

Based on the amount of interest shown in the Soviet military press of NATO helicopter tactics, it is also possible that we will see company and battalion size attack helicopter units being assigned down to the tank and motorized rifle regiments and battalions. This would increase their responsiveness to the maneuver elements and allow them a more defined role in such missions as ATGM suppression and flank security.

Finally, the rapid growth of the Soviet attack helicopter force can only be seen as their 'very real' belief in its ability as an element of success in the battlefield equation. NATO would do well to watch this progress closely for it could indicate the Soviet's perceived concept for the rapid tempo of the battlefield of the future.

APPENDIX "A"

SOVIET ATTACK HELICOPTERS³⁴

1. Mil Mi-1 "Hare" - serially produced since 1950-51 and has been used for communications, reconnaissance and liaison purposes. Powered by one, piston type engine, it has a h/p of 575, maximum speed of 170 km/h and a range of 235 km. This helicopter first appeared in an armed configuration (57 mm rockets) in the early 1960's. It is now out of production.
2. Mil Mi-2 "Hoplite" - serially produced since 1961 in Poland and was originally used in a cargo and troop transport role. Powered by two turboprop type engines, it has a h/p of 400, maximum speed of 210 km/h, and a range of 280 km. This helicopter also appeared in an armed configuration in the mid-60's, again 57 mm rockets. New enlarged, modified and more powerful version, Mi-2M began production in 1975.
3. Mil Mi-4 "Hound" - in service with the Soviet Air Forces since 1953, this helicopter was designed for transport, ASW and general-purpose use. Powered by one, piston type engine, it has a h/p of 1,700, maximum speed of 200 km/h, and a range of 425 km. The Army support version has a machine-gun in the front of the under-fuselage turret and can carry air-to surface rockets. This armed version also appeared in the mid-60's and is out of production at this time.
4. Mil Mi-8 "Hip" - considered the chief general utility helicopter of the Warsaw Pact, it was first fielded in 1964. Powered by two turboprop engines, it has a h/p of 1,500, maximum speed of 260 km/h, and a range of 450 km. Capable of carrying 26 passengers, this helicopter's typical armament is eight pods of 57 mm rockets, or a mix of gun pods and anti-tank missiles.
5. Kamov KA-25 "Hormone" - in service as an anti-submarine helicopter since 1965. A direct follow on of the KA-20 "Harp", it is powered by two turboprop engines with a h/p of 900, maximum speed of 193 km/h, and a range of 650 km. It carries one or two 400 mm AS torpedoes, nuclear or conventional depth charges or other stores carried in the internal weapons bay and small air-to-surface missiles on some aircraft.

FOOTNOTES

1. V. Ye. Savkin, Osnovnye Printsipy Operativnogo Iskusstva i Taktiki (The Basic Principles of Operational Art and Tactics). Moskva: Voyenizdat, 1972, p. 242.
2. Colonel M. Kiryukhin, "Eksperyty Vystrelily Vo Vremia Uprazhnenii" (Experts Fired During the Exercise), Voennyi Vestnik (Military Herald), (March, 1975), p. 86.
3. Major A. Gorbachev, "Desant Otrazhaet Udary Vertoletov" (An Airborne Assault Parries the Blows of Helicopters), Voennyi Vestnik (Military Herald), (October, 1975), p. 114.
4. Colonel M. Belov, "Puti Povyshenia Boevoi Effektivnosti Vertoletov" (Areas for Improvement of Combat Efficiency of Helicopters), Voennyi Vestnik (Military Herald), (April, 1975), p. 117.
5. Colonel M. Belov, "Helicopters Used By Ground Troops," The Soviet Military Review, (April, 1976), p. 31.
6. For further examination of Soviet helicopter characteristics and capabilities, see Appendix 'A'.
7. Alexander Malzeyev, "The Soviet Mi-24 (Hind) Combat Helicopter," International Defense Review, (June, 1975) p. 879.
8. DA Study: "Aviation Requirements for the Combat Structure of the Army II," (31 March, 1967), Appendix 'A' to Appendix 'B', p. B-a-4.
9. Herbert J. Coleman, "Soviets Push Scientist, Engineer Buildup," Aviation Week and Space Technology, (February 14, 1977) pp. 19-20.
10. Captain Y. Malakhov, "The Maintenance of Helicopters," The Soviet Military Review, (August, 1975), p. 38.
11. Colonel M. Belov, "Helicopters and Land Force Tactics," Soviet Military Review, (December, 1976), p. 22.
12. Malzeyev, "The Soviet Mi-24", p. 879.
13. "Gallery of Soviet Aerospace Weapons," Air Force Magazine, (March, 1976), p. 103.
14. Malzeyev, "The Soviet Mi-24", p. 879.
15. Benjamin F. Schemmer, "Soviet Armed Helicopter Force Said to Double by Middle of 1977," Armed Forces Journal International, (December, 1976), p. 28.

FOOTNOTES, CONT'D.

16. Ibid, p. 28.
17. Ibid, p. 28.
18. "Hind D Was a 'Surprise'," Armed Forces Journal International, (March, 1977), p. 7.
19. John W.R.Taylor, "Gallery of Soviet Aerospace Weapons," Air Force Magazine, (March, 1977), p. 98, and "Hind D Carries Added Weapons," Aviation Week and Space Technology, (February 21, 1977), p. 21.
20. Schemmer, "Soviet Armed Helicopter Force," p. 28. "Hughes Wins Army's Bid to Build 536 Advanced Attack Helicopters," Armed Forces Journal International, (January, 1977), p. 12.
21. Ray Bonds (editor), The Soviet War Machine, An Encyclopedia of Russian Military Equipment and Strategy, (New York: Chartwell Books Inc., 1976), p. 71-72.
22. Savkin, Art & Tactics, p 241.
23. Colonel Belov, "Helicopters in Antitank Warfare," Voennyi Vestnik, (February, 1974), "Areas for Improvement of the Combat Efficiency of Helicopters," Voennyi Vestnik, (April 1975), "Air Mobilization of Modern Armies, Soviet Military Review, (October, 1975), "Helicopters Used By Ground Troops," Soviet Military Review, (April, 1976), "Helicopters and Land Force Tactics," Soviet Military Review, (December, 1976).
24. Lieutenant-General V. Gatsolayev, "When Helicopters Are In the Air," Soviet Military Review, (September, 1974), p. 10.
25. Colonel M. Belov, "Vertolety V Bor'be S Tankami" (Helicopters in Antitank Warfare), Voennyi Vestnik (Military Herald), (February, 1974), p. 124.
26. Robert Hotz, "Battlefield Equation Changes Seen, Special Report: Egypt," Aviation Week and Space Technology, (July 14, 1975), pp. 14-15.
27. Belov, "Helicopters in Antitank Warfare," "Helicopters and Land Force Tactics," and "Helicopter Used By Ground Troops."
28. Colonel M.Belov, "Combat Employment of Helicopters at Sea," Soviet Military Review, (February, 1975), p.22.

FOOTNOTES, CONT'D.

29. Soviet War Machine, p. 91.
30. Norman Polmar, "The Soviet Aircraft Carrier," U.S. Naval Institute Proceedings, Naval Review, 1974, p. 159.
31. "Soviet Helicopter Outputs Up 50% Over Last Estimates," Armed Forces Journal International, (February, 1977), p. 12.
32. Belov, "Helicopters Used By Ground Troops," p. 31.
33. Belov, "Combat Employment of Helicopters at Sea," p. 23.
34. Information concerning these helicopters was gathered from the following sources:
 1. Colonel B. Aleksandrov, "Vertolety Strany Sovetskovo (Helicopters of the Country of the Soviets), Tekhnika i Vooruzheniya (Technology and Armament), # 8 (August, 1973), p. 58.
 2. John W.R.Taylor and Gordon Swanborough, Military Aircraft of the World, (New York: Charles Scribner's Sons, 1974), pp. 103, 104, 106, 209.
 3. USAREUR PAM No. 30-60-2, Identification Handbook, Soviet Bloc Airborne Equipment, Light and Transport Aircraft. July, 1963, pp. 72, 84, 96, 112, 120.
 4. Chartwell Books Inc., The Soviet War Machine, pp. 86-91, 99.

BIBLIOGRAPHY

BOOKS

1. Androv, I.I. Vertoloti V Vooruzhennoy Bor'be. (Helicopters in the Air Battle) Moskva: Voyenizdat, 1972.
2. Douglas, Joseph D. Jr. The Soviet Theater Nuclear Offensive. Washington, D.C.: U.S. Government Printing Office, 1976.
3. Lytov, I.S.: Segaydak, P.T. Motostrelkoviy Batalyon V Takticheskom Vozdushnom Desante. (Motorized Rifle Battalion in Tactical Air Drops) Moskva: Voyenizdat, 1969.
4. Salamander Book. The Soviet War Machine; An Encyclopedia of Russian Military Equipment and Strategy. (New York: Chartwell Book Inc., 1976).
5. Savkin, V. Ye. Colonel. Osnovnye Printsiipy Operativnogo Iskusstva i Taktiki. (The Basic Principles of Operational Art and Tactics) Moskva: Voyenizdat, 1972.
6. Taylor, John W.R. and Swanborough, Gordon. Military Aircraft of the World. New York: Charles Scribner's Sons, 1974.

BIBLIOGRAPHY

PERIODICALS

1. Aleksandrov, B. Colonel. "Vertolety Strany Sovetskogo" (Helicopters of the Country of the Soviets), Tekhnika i Vooruzheniya (Technology and Armament), # 8 (August, 1973) pp. 55-61.
2. Belov, M. Colonel. "Vertolety V Bor'be s Tankami" (Helicopters in Antitank Warfare), Voyennyi Vestnik, (Military Herald), # 2 (February, 1974) pp. 124-126.
3. Belov, M. Colonel. "Combat Employment of Helicopters at Sea", Soviet Military Review, #2 (February, 1975) pp. 22-24.
4. Belov, M. Colonel. "Puti Povysheniia Bosvoi Effektivnosti Vertoletov" (Areas of Improvement of the Combat Efficiency of Helicopters), Voyennyi Vestnik (Military Herald), # 4 (April, 1975) pp. 117-119.
5. Belov, M. Colonel. "Air Mobilization of Modern Armies," Soviet Military Review, # 10 (October, 1975) pp. 13-15.
6. Belov, M. Colonel. "Helicopters Used By Ground Troops," Soviet Military Review, # 4 (April, 1976) pp. 30-34.
7. Belov, M. Colonel. "Helicopters and Land Force Tactics," Soviet Military Review, # 12 (December, 1976) pp. 22-24.
8. DA Study. Aviation Requirements for the Combat Structure of the Army II. Defense Documentation Center: Alexandria, Virginia, 1967.
9. Gatsolayev, V. Lieutenant-General, "When Helicopters Are In the Air," Soviet Military Review, # 9 (September, 1974) pp. 10-13.
10. Gorbachev, A. Major. "Desant Otrazhaet Udary Vertoletov" (An Airborne Assault Parries the Blows of Helicopters), Voennyi Vestnik (Military Herald) # 10 (October, 1975) pp. 114-120.
11. "Hind D Carries Added Weapons" Aviation Week and Space Technology, February 21, 1977. p.21.
12. Hotz, Robert. "Battlefield Equation Changes Seen, Special Report: Egypt," Aviation Week and Space Technology. July 14, 1975. pp. 14-15.
13. "Hughes Wins Army's Bid to Build 536 Advanced Attack Helicopters," Armed Forces Journal International, January, 1977 pp. 12 and 20.

BIBLIOGRAPHY: CONT'D.

14. Kiryukhin, M. Colonel. "Eksperty Vystralili Vo Vremia Uprazhnenii" (Experts Fired During the Exercise), Voennyi Vestnik (Military Herald), #3 (March, 1975), pp. 86-91.
15. Khorobrykh, A. Colonel and Filatov, V. Lieutenant-Colonel. "901st Attacking," Soviet Military Review, #12 (December, 1976) pp. 18-19.
16. Malekhov, Y. Captain. "The Maintenance of Helicopters," Soviet Military Review, #8 (August, 1975) p. 38.
17. Malzeyev, Alexander. "The Soviet Mi-24 (Hind) Combat Helicopter," International Defense Review, #6 (June, 1975) pp. 879-881.
18. "Mi-24 Attack Version Can Fly Troops," Aviation Week and Space Technology, January 31, 1977, pp. 16-17.
19. Schemmer, Benjamin F. "Soviet Armed Helicopter Force Said to Double By Middle of 1977," Armed Forces Journal International, (December, 1976) pp. 28-29.
20. "Soviet Helicopter Output Up 50% Over Last Estimates," Armed Forces Journal International, (February, 1977) pp. 12 and 14.
21. Taylor, John W.R. "Gallery of Soviet Aerospace Weapons," Air Force Magazine, Volume 59, (March, 1976), pp. 93-107. "Gallery of Soviet Aerospace Weapons," Air Force Magazine, (March, 1977), pp. 88-103.